PRIORITY DOCUMENT

SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

Patent Office
Canberra

I, JANENE PEISKER, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2002952629 for a patent by SECURICOM (NSW) PTY LTD as filed on 13 November 2002.

COMMONWEALTH OF AUSTRALIA
AUSTRALIA
PATENT OFFICE

WITNESS my hand this
Twenty-sixth day of November 2003

JANENE PEISKER
TEAM LEADER EXAMINATION
SUPPORT AND SALES

S&F Ref: 610179

ORIGINAL

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION FOR THE INVENTION ENTITLED:

Solenoid Operated Latching Strike

Name and Address of Applicant:

Securicom (NSW) Pty Ltd, an Australian company, ACN 053 874 089, of PO Box 124, Ramsgate, New South Wales, 2217, Australia

Names of Inventors:

Christopher John Burke and Richard Bruce Harward

This invention is best described in the following statement:

SOLENOID OPERATED LATCHING STRIKE

Field of the Invention

The present invention relates to locks, and more particularly relates to solenoid operated latching strikes for remotely operated door locks.

Background of the Invention

Remotely operated door locks are often used to provide security controlled access to offices, home units, banks and other buildings requiring access control.

Such door locks typically consist of a retractable spring biased latch bolt fitted to the edge of the door and a latching strike assembly fitted to the door jamb. A latching strike positioned at the edge of a recess defined in the body of the latch strike assembly is pivotably displaceable between a closed position retaining the latch bolt within the recess and an open position releasing the latch bolt from the recess. The latch bolt retracts and rides over the edge of the latching strike and into the recess upon closing of the door. A locking means, typically in the form of a pin or set of pins or system of levers, is operated by way of a solenoid to lock the latching strike in the closed position to thereby lock the latch bolt within the recess and thereby retain the door in a locked state.

The presently available door locks as described above utilise a single solenoid to move the locking means between the locked and unlocked positions. The door locks are provided in one of two configurations. In the first 'fail safe' configured type of lock the locking means is maintained in the locking position when the solenoid is energised and in the unlocking position when the solenoid is not energised, providing a fail safe operation of the door lock, ensuring the door is unlocked when there is a power failure de-energising the solenoid. In the second 'fail secure' configured type of lock the locking means is maintained in the unlocking position when the solenoid is energised and in the locking position when the solenoid is not energised, providing a fail secure operation of the door lock, ensuring the door is locked when there is a power failure. In both of these configurations only one or the other of the locking and unlocking positions is a stable state.

These door locks require a constant power supply and energising of the solenoid to keep the locking means in either of the locked or unlocked positions (depending upon whether a fail safe or fail secure configuration). As a result of this power requirement, which is usually backed by a back up battery power supply to ensure continuous operation, these systems generally use a centralised electronic control system requiring significant wiring and infrastructure. Accordingly, these systems are not particularly suitable for small to medium buildings such as residential, small businesses, old style

dwellings and multiple buildings that are difficult or expensive to cable back to a central system.

Object of the Invention

It is an object of the present invention to overcome or substantially ameliorate the above disadvantages, or at least to provide a useful alternative.

Summary of the Invention

There is disclosed herein a latching strike assembly for a door lock comprising:

a body adapted to be fitted to a door jamb, said body defining a recess for receipt of a latch bolt;

a latching strike mounted to said body and defining a boundary of said recess, said latching strike being pivotable between a closed position for retaining said latch bolt within said recess and an open position for releasing said latch bolt from said recess;

a bistable detent means displaceable between a stable locking position at which said detent means engages said latching strike to lock said latching strike in said closed position and a stable unlocking position at which said detent means is disengaged from said latching strike, thereby enabling said latching strike to be deflected into said open position by said latch bolt;

a first solenoid adapted to displace said detent means from said locking position to said unlocking position; and

a second solenoid adapted to displace said detent means from said unlocking position to said locking position.

Typically, said locking and unlocking positions are stable by way of spring biasing means.

Preferably, said spring biasing means is an over centre spring.

Typically, said detent means is pivotably displaceable between said locking and unlocking positions.

Typically, said detent means engages an arm of said latching strike to lock said latching strike in said closed position.

Brief Description of the Drawings

A preferred form of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

Figure 1 is a perspective view of a latching strike assembly for a door lock.

Figure 2 is a schematic plan view depicting the operation of the latching strike of the latching strike assembly of Figure 1.

Figure 3 is a schematic side elevation view of the latching strike assembly of Figure 1 in a locked state.

Figure 4 is a schematic plan view of the latching strike assembly of Figure 1 in a locked state.

Figure 5 is a schematic front elevation view of the latching strike assembly of Figure 1 in a locked state.

Figure 6 is a schematic side elevation view of the latching strike assembly of Figure 1 in an unlocked and open state.

Figure 7 is a schematic plan view of the latching strike assembly of Figure 1 in an unlocked and open state.

Detailed Description of the Preferred Embodiments

Referring to Figure 1 of the accompanying drawings, a latching strike assembly for a door lock has a body 1 adapted to be fitted to a door jamb by way of fasteners passing through holes 2 formed in the front face of the body 1. The body defines a recess 3 for receipt of a latch bolt 100 as depicted in Figure 2. The latch bolt 100 is fitted to the edge face of the door mounted in the doorway defined by the door jamb and is spring loaded to enable it to extend and retract in the usual manner.

A latching strike 4 is mounted to the body 1 and defines a boundary of the recess 3. The latching strike 4 is pivotable about a pivot pin 5 mounted within the body 1 between a closed position, as depicted in solid lines in Figure 2, and an open position, as depicted in broken lines in Figure 2. In the closed position, the latching strike 4 retains the latch bolt 100 within the recess 3, whilst in the open position the latching strike 4 releases the latch bolt 100 from the recess 3. The latching strike 4 is spring biased to the closed position in the usual manner by way of a torsion spring (not depicted) encircling the pivot pin 5. During the action of closing the door, the chamfered end face 101 of the latch bolt 100 engages the angled leading face 6 of the latching strike 4 in the closed position. This engagement causes the latch bolt 100 to retract and ride up over the latching strike 4 and into the recess 3 to thereby hold the door in the closed position.

The latching strike 4 is locked in the closed position, depicted in Figures 3 through 5, by way of a bi-stable detent means in the form of a toggle 7. The toggle 7 is displaceable between a stable locking position, depicted in Figures 3 through 5, at which the toggle 7 engages the latching strike 4 to lock the latching strike 4 in the closed position, and a stable unlocking position, depicted in Figures 6 and 7, at which the toggle 7 is disengaged from the latching strike 4, thereby enabling the latching strike 4 to be deflected into the open position by the latch bolt 100.

The toggle 7 is bistable in that the toggle 7 is stably held in either of the locking and unlocking positions. This stability is provided by way of spring biasing means in the form of an over centre spring 8. When the toggle 7 is in the locking position as depicted in Figure 3 the over centre spring 8 creates an anticlockwise moment (as viewed in Figure 3) tending to retain the toggle 7 in the locking position. When the toggle 7 is in the unlocking position as depicted in Figure 6, the position of the over centre spring 8 in relation to the toggle pivot pin 9 results in a clockwise moment (as viewed in Figure 6) being created which retains the toggle 7 in the unlocking position. The over centre spring 8 is fixed at one end to the assembly body 1 and at the opposing end to a tab 10 formed on the toggle 7.

When the toggle 7 is in the locking position, depicted in Figures 3 to 5, an end engagement face 11 of the toggle 7 engages an arm 12 of the latching strike 4. As can best be seen from Figure 4, engagement between the toggle engagement face 11 and the latching strike arm 12 locks the latching strike 4 in the closed position, preventing it from rotating anti clockwise (as viewed in Figure 4) towards the open position.

When the toggle 7 is pivoted about the pivot pin 9 to the unlocking position depicted in Figures 6 and 7, the toggle engagement face 11 disengages the latching strike arm 12, enabling the latching strike 12 to pivot past the upper face 13 of the toggle as the latching strike 4 is moved to the open position (by engagement of the latch bolt 100 as the door is opened).

The toggle 7 is displaced between the locking and unlocking positions by way of first and second solenoids 14, 15. Activation of the first solenoid 14 drives the plunger 16 of the first solenoid 14 against a raised pad 17 formed on the toggle upper face 13, thereby pivoting the toggle 7 to the unlocking position. Conversely, activation of the second solenoid 15 engages drives the plunger 18 of the second solenoid against the lower face 19 of the toggle 7 to thereby move the toggle 7 to the locking position. Rather than having the toggle 7 arranged to be pivotably displaced between the locking and unlocking positions by the solenoids, it is envisaged that a linearly displaceable detent means might alternatively be utilised.

Movement of the toggle 7 between the locking and unlocking positions only requires a single pulse activation of either of the solenoids. Once the toggle 7 has been displaced to the alternate stable position, the activated solenoid can be immediately deactivated as opposed to in the prior art systems described above where the solenoid must remain activated to keep the detent in one of the two positions (with one position

being stable and the other being unstable and requiring continual force to be applied by the solenoid plunger).

Without the need for continual activation of either of the solenoids, the manner in which the latching strike assembly described may be powered and controlled is quite flexible. Due to the minimal power required, the latching strike assembly may be powered by batteries without the need for extensive wiring back to a central power supply and controller. The latching strike assembly may be controlled by any of various simple codified security control systems. For example, the assembly may be operated by standard RF key fobs (as used extensively with motor vehicle keys) operated by the user. An initial signal conveyed by the key fob would trigger a single voltage pulse to the first solenoid to unlock the door, and a second signal from the key fob would activate the second solenoid 15 to lock the door. Alternatively, the second solenoid 15 might automatically be operated after a time delay or some other indication that the door is ready to be relocked. A series of latching strike assemblies on various doors within a particular installation might be programmed to accept the same key fob codified signal.

The latching strike assembly described is analogous to a standard key and lock in that the key fob or other activating device changes the state of the lock from locked to unlocked (and vice versa) and then the lock remains in the new state without the necessity for continuous power input.

Dated 13 November 2002
Securicom (NSW) Pty Ltd
Patent Attorneys for the Applicant
SPRUSON & FERGUSON

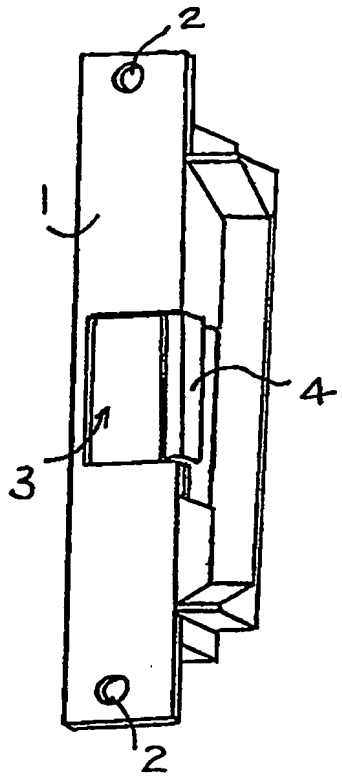

Fig. 1

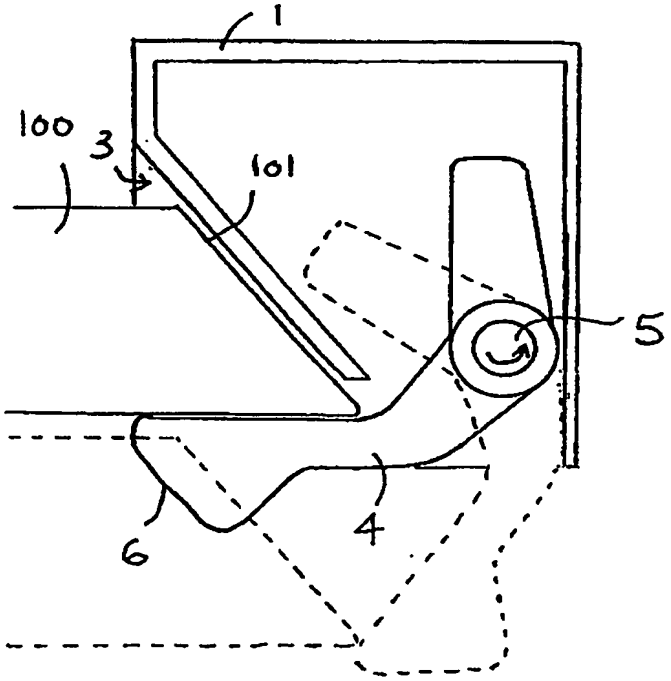

Fig. 2

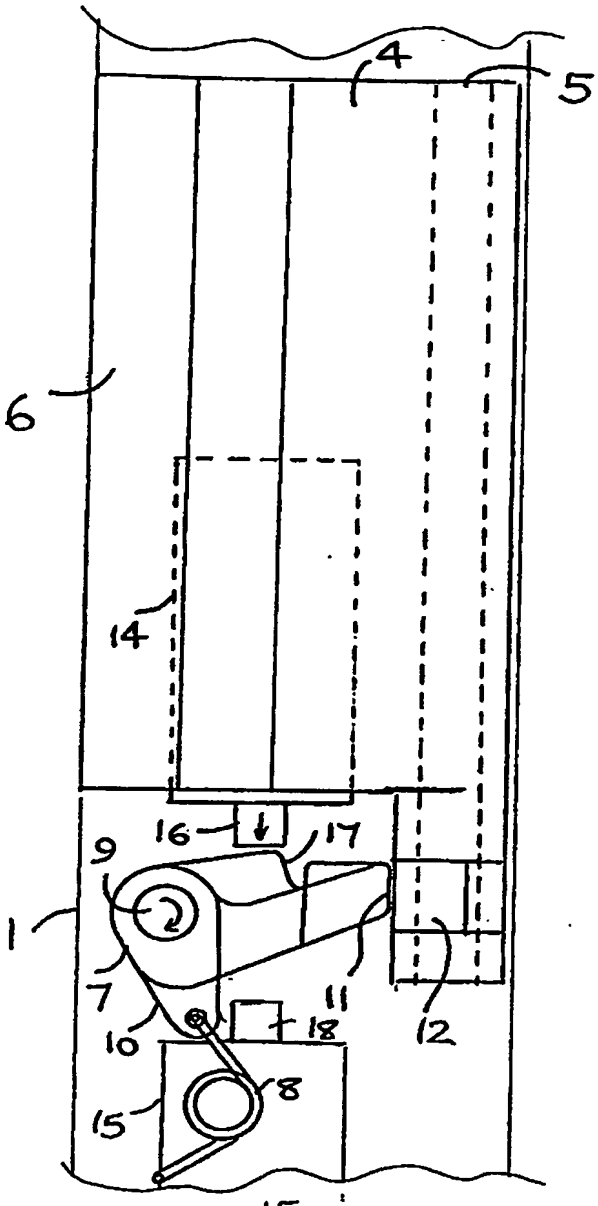

Fig. 3

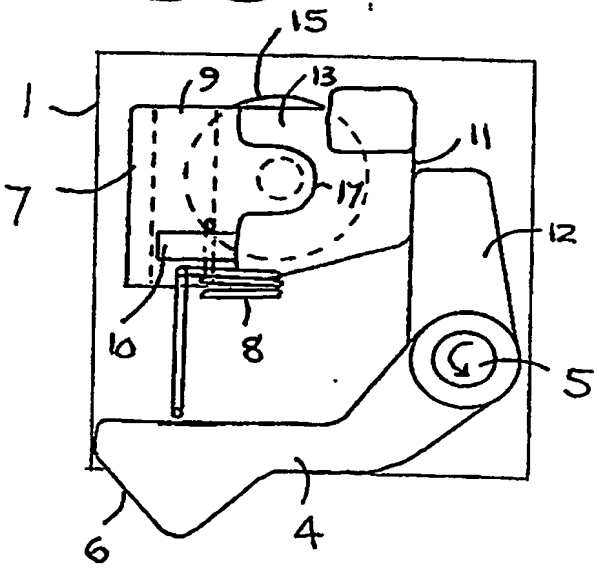

Fig. 4

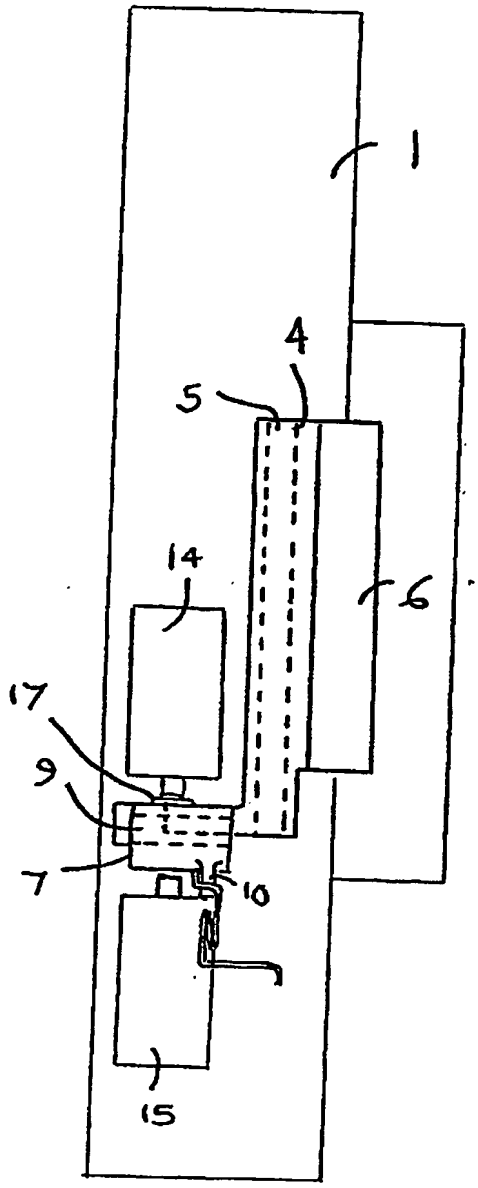

Fig. 5

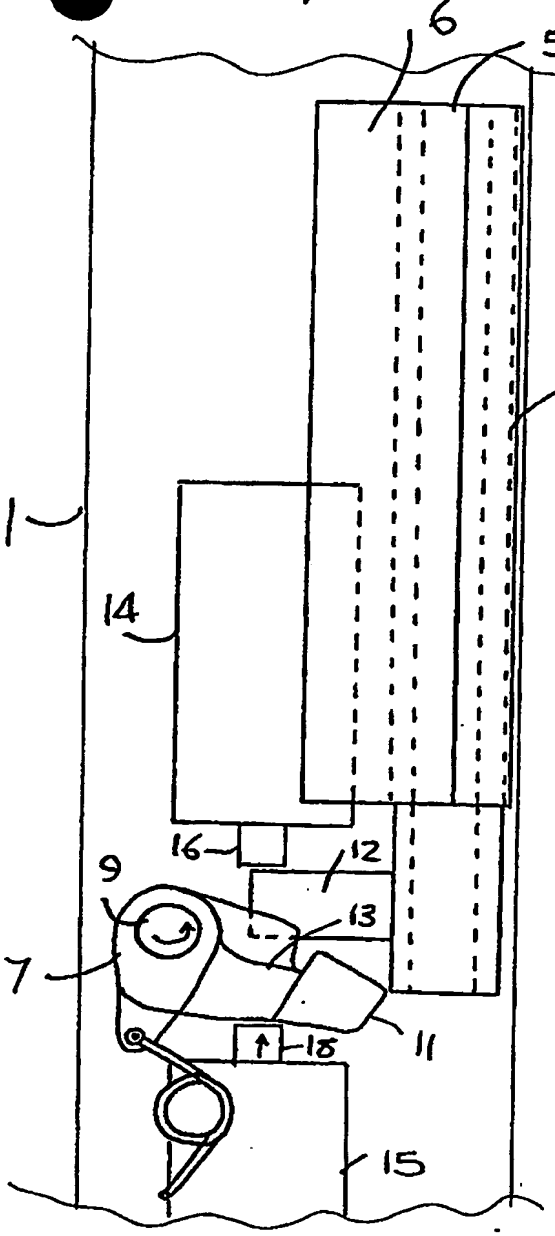

Fig. 6

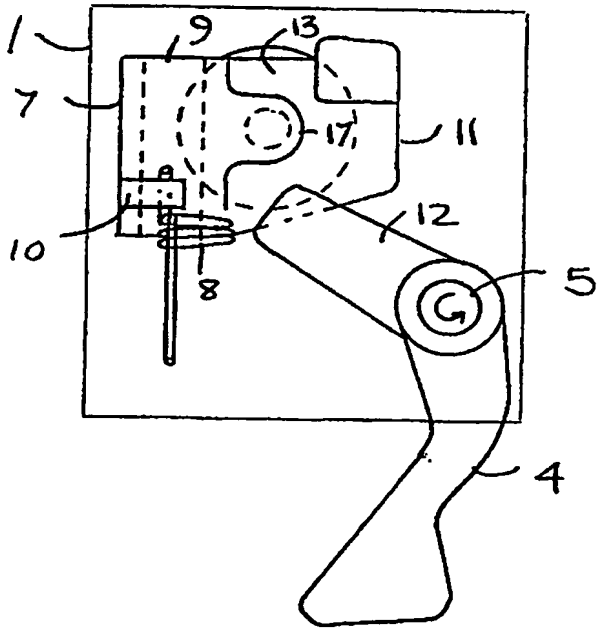

Fig. 7